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UNIVERSITY RESEARCH *in* ALBERTA

A Policy Framework

A Report to the
Honourable Jack Ady,
Minister of Advanced Education
and Career Development
By Gilles G. Cloutier
June 1995

July 14, 1995

Honourable Jack W. Ady
Minister of Advanced Education and Career Development
229 Legislature Building
Edmonton, Alberta T5K 2B6

Dear Mr. Ady:

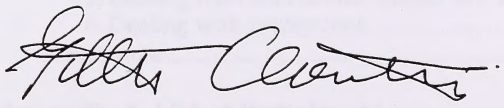
I am honoured to have been invited to conduct this review of issues related to university research in Alberta.

This task presented me and the staff of Alberta Advanced Education and Career Development with some significant challenges: we were in effect breaking new ground. However, we received invaluable advice and insights from the many people who participated in the consultation process - both within the universities and in the public and private sectors.

I have considered all of the ideas and thoughtful comments that were submitted to me, and I have studied the policies and programs that are being used in other jurisdictions. Having now concluded my deliberations about what is possible, desirable and appropriate for Alberta's universities with respect to research, I am pleased to present you with this report.

I trust that my recommendations will be helpful to you and your government colleagues.

Sincerely,



Gilles G. Cloutier

Consultant

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ACKNOWLEDGMENTS

Throughout this project, a great many people took the time to share their views and thoughtful insights with me. I extend sincere thanks to all of them for their invaluable assistance.

In particular, I wish to make the following acknowledgments:

1. I thank the Honourable Jack W. Ady, Minister of Advanced Education and Career Development. Mr. Ady's strong commitment to the project was a major factor in my decision to accept this challenging task. Since this is, to the best of my knowledge, the first time that the government of Alberta has undertaken such a review of the university research function, I was impressed that the Minister and the department decided to seek independent advice.
2. I extend special thanks to Dr. Rod Fraser and Dr. Martha Piper from the University of Alberta, to Professor Murray Fraser and Dr. Cooper Langford from The University of Calgary, and to Dr. Howard Tennant and Dr. Seamus O'Shea from The University of Lethbridge. As well, I thank Dr. Dominique Abrioux and Dr. Roberta Carey from Athabasca University.
3. I am especially grateful to the staff of Alberta Advanced Education and Career Development who provided all kinds of support during the project. Without them, I would not have been able to fulfill my obligations. In particular, I want to recognize the very special contribution of Colleen Mead, who acted as project manager. Her professionalism and her dedication were remarkable as well as her sound suggestions, criticisms and advice throughout the project.

DESCRIPTION OF THE PROJECT

Background

During 1993 and 1994, Alberta Advanced Education and Career Development (AECD)[1] undertook a strategic review of the entire adult learning system in Alberta. The review (*Adult Learning: Access through Innovation*, AECD, 1994), which included a broad public consultation in two phases, was designed to address significant trends affecting adult learning in the province.

University research was not included in the review of the adult learning system, but the Minister made a public commitment to hold a separate review of this important and complex area. Many of the same trends and pressures that were affecting the adult learning system were also having an impact on university research. For example:

1. University research programs are struggling to cope with increasingly limited resources. Provincial government funding for infrastructure is decreasing. The federal government's changes in its funding levels and arrangements are also affecting both direct and indirect research support.
2. Because knowledge and research are globalized, and highly trained researchers are extremely mobile, Alberta's universities are engaged in intense competition to retain and attract leading researchers. This is a difficult challenge when funds are severely limited.
3. Research and development organizations are being asked to demonstrate how their activities contribute to the province's well-being. There is a heightened demand for public accountability. If taxpayers' money is being spent on research, what are the results?
4. Research and development programs are becoming increasingly important in creating and sustaining a healthy economy.

This report represents a new direction for AECD. To a large extent, AECD has been relatively passive with respect to the area of university research.[2] However, for a variety of reasons, AECD now hopes to take a more pro-active stance.

AECD hopes to begin working with the universities and other interested and relevant groups to more clearly define its roles and responsibilities in university research. As well, the department hopes to develop a framework to guide the development of policies that will enhance the effectiveness of research in Alberta universities.

The consultation and review process

AECD has always had an explicit understanding of its interest and role in the teaching aspect of university programs. That sense of position allows the department to accommodate change and plan appropriately for new initiatives such as the Access Fund.

However, a comparable role for AECD in university research has not yet been defined. In good part, this review was designed to assist the department in defining its interest and role in this important area.

The mandate of the project that I was commissioned to conduct was to consider and report on:

- the role of university research in the current economic and social environment
- the role of AECD in university research
- appropriate goals, policies and strategies for Alberta's university research system, and related issues.

Norm Dovichi (Chemistry, University of Alberta) works in what has been called the most exciting scientific show on earth - identifying genes and understanding how gene mutations cause certain diseases. The knowledge that Dovichi's team is generating could revolutionize the diagnosis and treatment of disease. Dovichi's team is the only Canadian group - and one of only three outside the U.S. - funded directly by the U.S. Department of Energy's Human Genome Initiative.

Since reviewing the issues surrounding university research in Alberta was a new endeavour for the provincial government, I had no preconceived notions about what form the project should take. To get ideas about an appropriate approach, I met informally with each of the universities. At these meetings, I explained the general nature of the project and asked for assistance in defining and clarifying the project's direction and focus. I also asked people to support and contribute ideas to the project.

On the basis of the input I received at these informal meetings, I drafted a discussion paper, *Towards a Policy Framework for University Research* (AECD, March 1995). This short paper outlined critical issues and raised questions on some strategic decisions that universities and the government of Alberta may have to make in the near future. In each section, I listed questions that participants in the upcoming formal consultations might want to consider.

Formal consultations took place between April 18 and May 5, 1995. On some days, as many as five separate meetings were held. Because we wanted to hear the views of knowledgeable stakeholders, participation was by invitation. All participants were provided with a copy of the discussion paper in advance.

Each meeting was held with a homogeneous group. For example, members of a faculty association attended one meeting and student representatives attended

another. At each of the three residential universities (Alberta, Calgary and Lethbridge), I met with groups of administrators, selected faculty members who were extensively involved in research, representatives of the faculty association, and student (undergraduate and graduate) representatives.

Other participants in formal consultations included:

- Alberta Science and Research Authority
- Alberta Research Council
- Alberta Heritage Foundation for Medical Research
- Alberta government departments and agencies that have a direct interest in university research
- Calgary Research and Development Authority
- Edmonton Council for Advanced Technology
- representatives of the private sector in both Calgary and Edmonton.

A complete list of all those involved in the formal consultations is provided in Appendix A.

After the formal consultations had been completed, I worked with a project team in AECD to analyze and synthesize the input received. Before beginning to write this report, I also examined initiatives in this area that are being undertaken by other jurisdictions, and reflected on what is possible, desirable and appropriate in the Alberta context.

UNIVERSITY RESEARCH AND THE ALBERTA UNIVERSITY SYSTEM

Overview

Universities are unique. All other programs in the adult learning system (colleges, technical schools, vocational colleges, upgrading programs) are organized around the teaching of students. Universities, however, carry out two equally important and complementary roles: teaching and research.[3] Universities not only disseminate knowledge through instructional programs, but also *create* knowledge through research.

In Alberta, as in the rest of Canada, universities do the majority of the "knowledge creation" work. Admittedly, there are active and productive research programs in the private sector. But the universities provide an important core of knowledge and technical/academic expertise that is in the public domain.

The advancement and well-being of our society depends heavily on the new information that research provides regarding all aspects of daily life and work. Knowledge about medical care, communications technology, agricultural methods and environmental issues are examples that immediately come to mind. And it is practical and socially appropriate to have such knowledge and "know-how" developed at a university, where it can be made available to scholars and others who can benefit from it.

Much of Jacob Masliyah's fundamental research into the motions and forces in fluids (Chemical Engineering, University of Alberta) has been applied directly to the recovery of bitumen from oil sands. Masliyah has developed a computer program that simulates the process of extracting bitumen from oil sands. This program can be used to detect changes in the extraction processes, estimate the effects of such changes, and predict a plant's efficiency in recovering bitumen.

Basic or discipline-driven research also finds its natural home in the universities, where academic scientists and scholars specialize in and are highly qualified to do state-of-the-art research in their field of study. The universities employ people who are in touch with cutting edge knowledge and technologies. It is these university faculty who are Alberta's link with people around the world who are leaders in the same or related subjects.

Alberta's business and community leaders are aware of the economic and social importance of maintaining a link with the "world knowledge club." Although natural resources have traditionally been Alberta's primary sources of wealth, it is clear that additional industries, and especially "knowledge industries," are now needed to support the standard of living to which Albertans aspire.

In a brief submitted to me during the consultation process, Cooper Langford, Vice-President (Research), The University of Calgary, makes this statement:

> *The cultural, social and economic* ***development of Alberta*** *depends on access to knowledge. It is now a cliché to note that we are entering a knowledge economy. The Alberta universities provide a major channel for the entry of new*

knowledge into the province. This is especially the case for novel and emerging areas which are pursued initially as a matter of intellectual challenge only to become, with the changing environment, central concerns to all sectors. Alberta creates only a tiny fraction of the new knowledge but it is the quality of that fraction that gains a place for Albertans at the table where the world's knowledge resources are discussed, developed and shared.

In summary, the research function of a publicly funded university is an essential aspect of a healthy economy and social system. It is not an optional add-on.

Training highly qualified personnel

Today, virtually everyone agrees that a society's strength in the world of the future (if not the present) will depend in good part on what the people in that society know and are able to do. One of the valuable products of university research, besides new knowledge, is highly skilled and knowledgeable people.

Ken McKenzie, Ron Kneebone and Chris Bruce (Economics, The University of Calgary) are coordinating a study of the Alberta Deficit Elimination Program. (Nine other economists and political scientists from the universities of Calgary and Alberta are also involved.) The study will focus on how the budget cuts were implemented in Education, Health, Advanced Education and Social Services, and the substantial institutional reforms that accompanied the cuts.

Therefore, those who suggest that university faculty should do less research - that they should be concentrating on teaching - overlook the central role of research in the purpose and life of a university. Research is one of the main vehicles used in advanced training and education.

Graduate studies is largely an apprenticeship in learning how to carry out increasingly complex research. Just as it is impossible to write a good paper if you have not mastered the subject matter, productive research requires a mastery of the discipline. Graduate-level expertise arises out of the practice of research.

The research function, which trains people how to think, determines the university faculty's value to students and to society. Both graduate and undergraduate students are attracted to a particular university largely because of its faculty. By and large, the value and quality of a university is determined on the basis of one criterion: what can be learned from those who teach and do research there. The faculty are a university's most important resource, and its faculty's research record determines its reputation.

A brief submitted by the University of Lethbridge makes this observation:

> *A university that does not offer its students appropriate experience in scholarship will never meet its mandate of preparing students for a productive*

life in society. In lectures, seminars, tutorials, independent studies and laboratories, the subject matter and/or the processes of our teaching are intimately linked to our research. We are able to excel in our leadership only because we develop skills, expertise and knowledge in our research. Without our research we could only parrot textbooks, hardly an acceptable model of university education or of meeting our mandate.

In a sense, excellent university teaching is an outcome of a strong research program. Students seek out faculty who are involved in outstanding and leading edge research projects, as these are the people who can offer the best learning experiences to them. When the faculty at a university are engaged in challenging research, the level of enthusiasm for scholarship and learning increases, among both teachers and students. There is a clear relationship, and a strong one, between the quality of graduate teaching and the level of related research that is going on at a university.

This is why university faculty members, while carrying out their teaching responsibilities, must give a high priority to their research work. Their ability to perform meaningful research defines their value, not only in their research field, but also to the university as a whole.

Cooper Langford, Vice-President (Research), The University of Calgary, provided me with these comments on this issue:

The universities have a mission to create a learning environment. At its best this environment provides a continuum of experience from that of the beginning student to that of the most sophisticated researcher. For all, it fosters critical thinking, problem solving, humane sensibility and creativity. In meeting the goal of universities as contributors to ***human resource development****, it is necessary but not sufficient that we have good teachers. We must attract and retain the most creative and best possible "learners" to our faculty. Among the roles of the university is the unique assignment of preparing the next generation of research staff for all sectors: industry, government and academia.*

The University Experience

The university experience is different from the college experience. At a university, students are not only exposed to the current body of knowledge, as they would be in college. Students also explore the foundations of that knowledge and learn how to go about finding or developing new knowledge and understanding. In other words, students at a good university are exposed to both teaching and research, and the two activities are intimately connected.

It is often correctly said that the best teachers are not necessarily the best researchers, and the best researchers are not necessarily the best teachers. But the best universities have succeeded in nurturing excellence in both domains, and in making the best connections between them.

Ideally, students at a university are experiencing education, as opposed to training. They are learning how to think systematically, which gives them the ability to generate new knowledge and understanding.

Alberta's Universities

Enrolments and programs

Alberta has four universities.

The University of Alberta and The University of Calgary carry out a full range of research activities and house a full range of graduate and undergraduate programs. Both universities offer the same or similar graduate programs in areas of high demand (for example, the Master's program in Sociology). But in areas of lower demand, the two universities tend to offer complementary programs.

The University of Lethbridge is a small university specializing in undergraduate liberal arts education. Its graduate offerings are currently limited to the Master's of Education, Master's of Science and Master's of Arts programs. Athabasca University is a non-residential, distance education delivery university that offers Master's programs in two areas: distance learning and business administration.

Enrolments, 1993-94

Number of Students (Full-time Equivalent)

University	Total	Graduate
University of Alberta	29,939	4022
University of Calgary	21,672	2,572
University of Lethbridge	4,711	72
Athabasca University	3,943	--- *

* Athabasca University enrolled its first graduate students in the 1994-95 academic year.

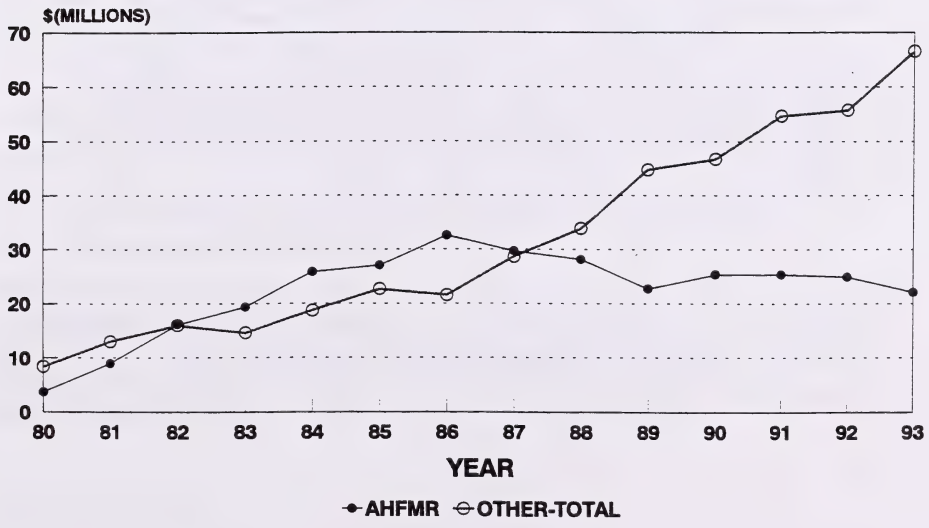
Research

As in most Canadian universities, the major portion of the incremental funding provided to universities in Alberta for research comes from external sources and is allocated to specific projects. For the past few years, external funding for research in Alberta universities has totalled approximately $150 million per year.

Provincial government funding. In the fiscal year 1993-94, the provincial government, through its departments and agencies, provided approximately $31 million to support research projects in Alberta universities. Of this total, almost $22 million was provided by the Alberta Heritage Fund for Medical Research (AHFMR).[4] The extraordinary level of support for research provided by AHFMR, created by an endowment from the government in 1980, has helped Alberta to become a major centre for medical research in Canada.

Provincial government funding is provided for research into areas that are considered to be of strategic social, cultural or economic importance in Alberta.[5] Consequently, a large portion of Alberta government funding to date has been directed towards research in agriculture, oil sands and energy technology, and transportation issues, and to medical research, as mentioned above. Money invested in university research by the AHFMR has had a strong levering effect in terms of attracting outstanding medical talent and significant external resources to Alberta.

MEDICAL RESEARCH IN ALBERTA
FUNDING IN MEDICAL SCHOOLS 1980-93



According to the provincial government's own analysis:

> *Alberta universities perform approximately one-third of the provincial government funded Research and Development through grants and contracts from the departments and agencies. These investments in research are instrumental in attracting a growing Research and Development investment by federal and international funding agencies and industry in the province.*[6]

Federal granting councils funding. The Natural Sciences and Engineering Research Council (NSERC), the Social Sciences and Humanities Research Council (SSHRC) and the Medical Research Council (MRC) currently provide grants totalling almost $67 million per year for research conducted in Alberta universities. Most of the direct support for university research comes from these sources.

Aritha van Herk (The University of Calgary) is an author, teacher and literary critic who has earned an international reputation. Her first novel, ***Judith*** *(1978), was translated into seven languages, and her subsequent novels, short stories and book reviews have been widely published and read. Van Herk's ability to transform the raw materials of the imagination into works of art is putting Alberta on the map.*

Federal granting councils funding is provided, through peer adjudication, on the basis of the quality of the research. The role of the federal granting councils is to foster a critical mass of research excellence across the country. Their primary concerns are to train top researchers and scholars, and to maintain continuity in new knowledge creation.

Business, non-profit agencies and other governments provide a substantial amount of funding in support of research projects at Alberta universities. These agencies generally support projects that they believe are of strategic or problem-solving importance.

The amount of support that the business and community sectors provide to university research has grown tremendously over the past decade. Between 1983-84 and 1993-94, the level of support from these sources increased from approximately $11 million to approximately $43 million, an increase of about 290%! As a comparison, growth in university enrolment during this same period was just over 18% and growth in operating grants was approximately 39%.

Alberta Universities Sponsored Research Income 1993-94

sources	university	$ ('000's)
Federal Government	Alberta	44,619
	Calgary	28,168
	Lethbridge	1,452
	Athabasca	383
Alberta Government	Alberta	17,289
	Calgary	13,297
	Lethbridge	247
	Athabasca	---
Other Governments	Alberta	1,132
	Calgary	556
	Lethbridge	---
	Athabasca	---
Business	Alberta	9,988
	Calgary	8,570
	Lethbridge	2
	Athabasca	---
Not for Profit	Alberta	13,412
	Calgary	8,439
	Lethbridge	413
	Athabasca	---
Other	Alberta	774
	Calgary	1,449
	Lethbridge	185
	Athabasca	44
Total	**Alberta**	**87,214**
	Calgary	**60,429**
	Lethbridge	**2,299**
	Athabasca	**427**

Infrastructure funding. Of the approximately $400 million in operating grants that AECD provides to universities each year (which is in addition to the direct grants and other types of support for research described above), an estimated[7] 30 to 40% (approximately $150 million per year) supports the costs of university research, either directly or indirectly. This level of funding makes AECD the largest single funder of university research in Alberta. Provincial operating grants underwrite the cost of the university infrastructure that supports both teaching and the research functions (for example, salaries, services, space, laboratory equipment and libraries).

Provincial operating grants are now insufficient, however, to cover current needs for equipment replacement, maintenance, upgrading and acquisition. Some of these needs are being met through funding from federal government granting councils, and equipment purchased in this way is often used for both research and teaching.

Quality and quantity of research

Universities in Alberta are leaders in Canada, in terms of both the quantity and quality of research they do. When Canada's universities are ranked according to the volume of sponsored research funding they receive, both the University of Alberta and The University of Calgary are in the top ten. (The University of Alberta ranks fifth and The University of Calgary ranks tenth.) These two Alberta universities are in the company of such other well known Canadian universities as McGill University, The University of Toronto, the University of British Columbia, Queens University and the Université de Montreal.

In terms of the average level of funding that Alberta's universities receive from the federal granting councils - per faculty member - Alberta's universities and faculty rank third among the provinces. Since the federal granting council awards are highly competitive and peer-adjudicated, obtaining such a high level of funding is no small achievement.

Peer-Adjudicated Sponsored Research Income as Awarded by the Federal Granting Councils/Per Full-Time Faculty Member
1992-93

	$	Rank
British Columbia	28,460.00	1
Alberta	**19,690.00**	**3**
Saskatchewan	12,570.00	6
Manitoba	12,710.00	5
Ontario	16,750.00	4
Quebec	20,090.00	2
New Brunswick	6,020.00	9
Nova Scotia	11,060.00	7
Prince Edward Island	3,780.00	10
Newfoundland	9,800.00	8
Canadian Average	**17,550.00**	

Sources: (1) Statistics Canada Cat. #81-229, Education in Canada 1992-93
(2) Statistics Canada for Canadian Association of Business Officers, Financial Statistics of Universities and Colleges, 1992-93

Notes:

1. The top three provinces (British Columbia, Quebec and Alberta) occupy a different range than do the other seven provinces, all of which are below the Canadian average.
2. Quebec and Alberta (ranked second and third respectively) are extremely close, with a spread less than $1,000 per faculty member.

As shown in the preceding table, Alberta is on the heels of Quebec, and significantly behind only British Columbia. B.C. is by far the leading Canadian province in university research largely as a result of the research excellence at the University of British Columbia.

Albertans have a right to be proud of the research reputation of their universities. Alberta university research is highly valued, not only by the scientific and academic community, but also by the Alberta business sector and by other employers and agencies. University research faculty in Alberta are recognized as a valuable resource because of their expertise and problem-solving ability.

RESULTS OF THE CONSULTATIONS ON UNIVERSITY RESEARCH

Many people took the time to provide their observations, comments and suggestions regarding university research, both at the invitational meetings and in written submissions. Participants included the university community, staff of government departments and agencies, and representatives of the private sector.[8] As well, each of the Alberta universities and many other interested groups and agencies provided extensive statistics, reports and other extremely helpful documentation.

This section of the report highlights the major findings that I identified during the consultation process.

The role of university research

Universities conduct a significant majority of all research that is done in the province, and are active participants in an international network of new knowledge. Because of this, the universities are one of Alberta's primary links with the rest of the world, and one of the major contributors to the province's cultural, social and economic development. University research must therefore be regarded as an essential activity - in all disciplines within the university system.

Weining Zhang's research (Mathematics and Computer Science, The University of Lethbridge) keeps him at the frontier of knowledge in his field and in contact with the world's best database researchers and the leading database industrial companies. Because of his research, Zhang is better able to understand what the future of information systems will be, and to develop and update the computer science curriculum for students at the university.

In areas where new knowledge is being generated at a rapid pace, there is a greater need for intensive research. And since this requires additional time, human resources and equipment, the cost of maintaining a competitive position in these areas is much higher. This may explain why the cost of research in most areas of the natural sciences, engineering and medicine tends to be much higher than in many areas of the social sciences and humanities.

The need for major research investments in universities is also linked to the existence of graduate programs, since the training of graduate students is intimately linked with the research activities of the faculty. In fact, much of the research infrastructure in the universities is related to the size of the graduate programs; the infrastructure required to support a graduate student is generally substantially larger than for an undergraduate student.

Alberta's University System

Most Albertans are aware of the importance of the research function at the University of Alberta and The University of Calgary and that these two universities each have a significant graduate student body.

Perhaps because they are unique, and perhaps because they expressed concern over other's attributed perceptions respecting the legitimacy of research within their institutions, I feel that there is need to clarify and make special mention of the role of research at The University of Lethbridge and Athabasca University.

The University of Lethbridge

Many members of the University of Lethbridge community expressed concern that the government in general and the department in particular do not view research as a legitimate function at The University of Lethbridge. Although I am not in a position to say whether that perception is accurate, I would like to note that I was highly impressed with this university's dedication to quality research. I have to admit that (perhaps like others) I was agreeably surprised at the quality of the Lethbridge faculty (many of whom are national leaders in their field) and the quality of the student body.

As in other universities, research is central to the life of The University of Lethbridge. Students there clearly benefit from the presence of quality research faculty. (Students told me this directly.) The community of Lethbridge also benefits; The University of Lethbridge has forged strong and enduring links with the community at many levels.

Michael Stingl (Philosophy, The University of Lethbridge) is taking a sabbatical year to study euthanasia policy and its social consequences in the Netherlands, and general health reform issues in Europe. The knowledge resulting from Stingl's research will be helpful to students at the university, and to the many health care decision makers in Alberta who are currently struggling with difficult decisions.

Having discussed these and other related issues extensively with faculty and students at The University of Lethbridge, I am certain that this university will continue its dedication to quality in research and teaching, and that the central place that research holds in the life of that institution will continue to benefit both the students and the community of Lethbridge.

Athabasca University

Athabasca University is a university of a very special sort. Since its mandate is for distance education, and since it has no students "on campus," it does not require the same physical infrastructure as other universities. And of course this lack of infrastructure places a significant limitation on the nature and the extent of the research that can be carried out at Athabasca University.

All the same, Athabasca University has a strong mandate and niche in the areas of research in distance delivery technology and pedagogy. As well, the faculty of Athabasca University are bound by their collective agreement to engage in a minimum amount of research, so as to stay up to date with scholarly developments in their fields. At Athabasca University, as at other universities, research is fundamental to the contribution of faculty and an essential part of the university experience for students.

The quality of university research

Because of their achievements in many research fields, Alberta's universities are represented in the "international club of knowledge." To maintain access to the international knowledge network, however, the universities must keep their research standards at international levels.

Standards for faculty

It is a matter for some concern that the public is generally unaware of the high standards that university faculty maintain, and of the systems used to establish and enforce these standards. The outstanding work of academic researchers in Alberta often goes unnoticed.

A brief submitted by the University of Alberta provided these comments on this issue:

> *The objectives of the university are excellence in both teaching and research. Faculty are already highly accountable for performance in both areas. Annual review of teaching performance, backed up by student evaluation, is our policy. Faculty members are accountable in the same annual evaluation for their research performance, and this accountability extends in spades to the public and private organizations that support their research. In fact, there is fear that the increasing expectations for steady "productivity" by both the institution and by the research sponsors may discourage researchers from undertaking projects with potential for high pay-off but with attendant high risk.*

Each university has a system for evaluating its faculty annually. These evaluations address a faculty member's performance in three areas: teaching, research and community service. As well, those who apply for funds from federal granting councils are evaluated by their peers from across the country, and must measure up to national standards of research quality.

As well, university administrators and faculty members repeatedly told me that the level of tolerance for unproductive faculty is quickly diminishing as resources become increasingly scarce.

During the consultations, I frequently heard that the retention and recruitment of excellent researchers is becoming a serious problem. A number of university administrators and faculty members feel that, because of fiscal challenges, universities in Alberta can no longer compete: many other universities outside the province can offer more time to do research and/or more infrastructure support. My perception is that, while university faculty are always mobile, there is currently a strong and disturbing trend towards out-migration of the best

faculty from Alberta's universities, and it is becoming increasingly difficult to attract high quality replacements. This trend does not bode well for the future quality of Alberta university education and research.

In their brief, The University of Lethbridge describes the problem this way:

> *The loss of competitiveness would have devastating consequences for our ability to recruit faculty and students. What bright young scholar would willingly choose to be employed in a university lacking an active, vibrant community of scholars? What student would willingly choose a university nationally ranked as second rate? What kind of professional service could we render to our local, provincial and national communities? In short, the University of Lethbridge would not, in the sense normally used in our modern society, continue to be a university.*

I also heard throughout the consultations that Alberta university faculty are currently facing a serious morale problem, and this includes the top research staff. A substantial number of people in the universities, and in the private sector, believe that universities in Alberta are losing ground in the competition with other major research universities in Canada.

The people I spoke with attribute this problem to two main causes:

1. a drastic reduction in infrastructure resources
2. decreased morale and an increased rate of exodus among top quality faculty, based in good part on a perception that the provincial government does not place a high value on universities and university research.

Standards for students

Students reported that they benefit directly from the quality of research that is being conducted by the university. This is especially true in the case of graduate students, but undergraduates also reap significant benefits. (Undergraduate students, particularly those who are in the last two years leading to a degree, told me that they generally receive a better quality of teaching if their professors are involved in research.) Consequently, Alberta universities need to be able to retain and attract the most highly skilled research faculty in order to retain and attract the highest quality of students.

At the same time, some people are concerned that, within the current climate of fiscal restraint, the indirect costs of research may be eroding resources for the teaching infrastructure.

It was repeatedly pointed out - and I know this is the case - that outstanding graduate students select the university they will attend on the basis of two factors: access to top calibre researchers and the financial support that is available to them. The student decides where to go according to the reputation of the university in his or her chosen field and what is being offered.

Anne Rochet's research (Speech Language Pathology, University of Alberta) is designed to find out which kinds of exercises are most effective in helping people learn to make their faces work again after facial nerve damage. One method Rochet is studying involves having patients do facial exercises while looking in a mirror; in the other method, electrodes are placed on the face to pick up muscle activity and show it to the patient on a screen.

These are the main factors that graduate students and others use to evaluate the quality of a graduate program:

- the quality of the research and the research reputation of the faculty
- what financial support is being offered
- the number of out-of-country students that are enrolled
- the success of graduates in finding jobs
- the employer's evaluation of the graduate's abilities.

The people I consulted said that excellent graduate students from other provinces and other countries usually contribute more than they receive from the university they attend. These graduate students help to raise standards of excellence; they create a climate of national and international interaction which is the essence of research activities in today's world; and they contribute to the Alberta economy. Yet, in Alberta, graduate students from outside the country are being asked to pay a differential tuition fee.

Funding

Significant needs are developing in the areas of libraries, information technologies and capital equipment generally. As well, due to a lack of funds, maintenance of current capital assets is being deferred. This means that, even if university faculty are able to obtain grants to cover the direct, incremental costs of their research, they are likely to have problems because of an inadequate infrastructure. Many participants in the consultations said that this matter is a major concern, and it requires immediate attention.

Several possible solutions to the infrastructure problem were proposed, including:

- offering a matching grant award, at 20% for peer-adjudicated research
- reinstating the provincial government matching grants program to reinforce private contributions. (Matching need not be at 100%.)

Accountability

Representatives of the universities recognized that, although they do a good job of being accountable to the people who fund their research (which includes the private sector), they are less successful in communicating with and presenting results to the government and Albertans. The universities' current work on performance indicators (a joint project with AECD) will help somewhat in addressing this issue, at least in critical areas of performance.

Being accountable to the taxpayer is essential, not only because Albertans have a right to know where their money is being spent, but also because public transparency will help to develop stronger public support for important research pursuits.

Since students are the universities' major and most direct client, university research programs must be aware of and responsive to student needs at all times. As well, the universities need to improve their "research image" by demonstrating clearly and frequently how their research programs have contributed, and continue to contribute, to the quality of student instruction as well as to the quality of daily life in Alberta.

University innovation and responsiveness to change

During the consultations, I was impressed by the number of significant, innovative changes that Alberta's universities have already introduced, as they strive to do "more and better with less." I have found that universities in Alberta are beginning to do many things differently, and there is a strong trend towards positive innovation.

The following examples are just a few selected initiatives and strategies; there are many similar activities underway as well. In each case, the university involved is working to achieve two equally important goals: excellence and effectiveness.

1. The University of Alberta has developed a strategic plan called "Degrees of Freedom." This plan involves building on strengths and shifting resources over time to support emerging areas of true excellence. The University is using this type of plan to set its short and longer-term operational priorities for resource allocation and to support effective decision-making. Only areas that are deemed worthy of support - taking into account strength, need and capability - will receive priority attention.

2. The University of Lethbridge is embarking on a broad-based fundraising campaign to support the "LINC" project - the Library Information Network Centre. This project is providing a highly cost-effective solution to the problem of severe space shortages in the present library. As well, it is developing a "communications hub for southern Alberta" and allowing for the enrolment of up to 1,000 more students. This forward-looking project recognizes that people need to move away from paper to a more widely accessible and dynamic form of information storage and retrieval that is available to a broader population base.

3. The University of Calgary has initiated and adopted a policy on hiring replacement faculty that ensures that The University of Calgary and the University of Alberta work in a complementary fashion, not just at the planning level, but operationally as well. I understand that, before a position is approved by the President for recruitment at The University of Calgary, among another things, there must be evidence that the University of Alberta has been consulted. It must also be demonstrated that, in a framework of complementarity between the two institutions, it would make sense for The University of Calgary to recruit to a given position. I am impressed that these two autonomous institutions are cooperating and collaborating to this degree regarding the allocation of faculty, which are the universities' largest resource.

The universities in Alberta are definitely taking new approaches and doing business in new ways. There are new incentive retirement programs, new faculty evaluation systems and new methods of delivering core courses that are offered in more than one institution. There is evidence of a common desire to provide the best possible service to students and the community with the resources that are available.

The role of Advanced Education and Career Development

Many people who participated in the consultations suggested that AECD should play a more active role in supporting university research. They said there is a need for AECD to play a more assertive role in fostering university research and to act as an advocate of university research within the government. In their view (and I concur), AECD is in an ideal position to ensure that members of the legislature and people in other government departments fully appreciate the value of university research.

A number of people also feel that AECD could do more to promote positive change in universities. For example, there were suggestions that AECD could

offer more incentives to universities that are trying to improve their effectiveness, build on their strengths and pursue collaborative projects.

Specifically, I received suggestions that AECD should:

- be a "spokesperson" for university research within government
- provide adequate infrastructure for university research
- provide incentives that will promote positive changes in universities; for example, improved efficiency and increased collaboration
- be a party to the development of any government policies and initiatives that relate to university research.
- develop strong linkages with the new Alberta Science and Research Authority
- work in partnership with universities to develop a strategy for maximizing the research funding they receive from federal granting councils
- work in partnership with the universities to promote more effective communication (with the government as a whole and the public) regarding the importance of university research.

Key university interactions

Interactions with other universities

When resources are limited, opportunities for increased collaboration often develop. If the universities in Alberta can combine their strengths in research activity and graduate programs, and support each other in overcoming weaknesses, everyone stands to benefit.

Participants in the consultation meetings gave examples of many collaborative research and graduate programs at the universities of Alberta and Calgary, and suggested that there should be more of these types of projects. Video, computer technologies and other communications systems are making this approach more and more viable. It was suggested that Advanced Education and Career Development should explore ways of stimulating more intensive and formal consultation between universities.

Keith Johnstone (Drama, The University of Calgary) created "theatre sports," an improvisational theatre process that has become a dramatic genre practiced all over the world.

People from all sectors also strongly emphasized the international nature of the universities and the need for Alberta universities to maintain close contact with other universities in Canada and around the world.

Interactions with the private sector

Although a number of collaborative efforts are already underway between the universities and the private sector, many additional suggestions were received about increasing the interface between these two groups. Since substantial and concrete results have accrued from these types of initiatives, it would seem desirable to have more of them.

Usher Fleising's research on the biotechnology business (Anthropology, The University of Calgary) provides information on how scientific innovations are transformed for public consumption. Such knowledge is used to better manage high technology organizations and to construct research and development policy on matters related to balancing social benefits with individuals' rights. Fleising's work also identifies social problems associated with the use of genetic technologies in industry.

The majority of the participants in the consultations felt that, although the universities are the best agents of knowledge generation, they are not the best agents for transferring research technologies, other than through the training of highly skilled workers. Therefore, once potentially interesting results emerge, other partners should probably take the lead in facilitating the transfer of the results to industry.

One especially active type of partnership was noted in the discussions: the cities of Edmonton, Calgary and Lethbridge are actively involved with research initiatives at the universities that are located within their jurisdiction. Another way in which linkages are formed between the universities and the private sector is through the many research organizations and institutes that promote the commercialization of university research results, such as TR Labs and the Alberta Microelectronics Centre (AMC). These institutes have been generated by the universities, by private industries, by government, and by professional, business and commercial associations. They represent a real strength in Alberta.

Private sector businesses and agencies or departments of government tend to enter into research contracts with the universities when they have an interest or mandate in particular problems or issues that are relevant to Alberta's economic and social development. In this way, the universities are likely to interact with government agencies such as Alberta Agriculture, Alberta Energy or the newly-created Alberta Science and Research Authority. AECD's responsibility, on the other hand, relates more directly to the research infrastructure and the research endeavour as a whole.

Two issues received a considerable amount of attention:

1. The business community strongly supports the universities, but acknowledges that it could be doing more to express its support publicly. Most members of the business community feel that the universities need this type of validation in the current climate: some segments of the public and the government tend to downplay the importance of the contributions of universities and university research.

2. While collaborating with private sector research, the universities must be careful to ensure that the bulk of their research results remain in the public domain.

Interactions with government departments and agencies

Universities in Alberta have an intensive relationship with several government agencies, including the Alberta Research Council. The universities carry out a major portion of the research agendas of the departments of Agriculture, Energy, Environment, Transportation and others. The universities should be encouraged to continue developing these types of relationships.

Perceptions

Some perceptions about university research were voiced repeatedly during the consultations. I feel that, although the majority of people may not hold these views, special attention should nonetheless be given to them. They illustrate the climate in which a new policy on university research will be developed and implemented. The cooperation of the universities, along with support from all other affected sectors, is essential to the successful implementation of a university research policy.

Following are the most important perceptions that were brought to my attention:

- The majority of members of the university community have expressed their appreciation for the initiative taken by AECD to develop a policy on university research, but many also viewed it as an attempt to intervene in the universities' internal management.
- Many Albertans feel that universities are an important source of highly trained professionals and skilled researchers for the province.
- Many members of the business community, especially those who deal with value-added products and processes, strongly support the universities and their research role.
- There is a feeling, among university faculty and some business sectors, that the provincial government needs to become better informed about the importance of university research.

A major research project undertaken by William Kerr (Economics, The University of Calgary) is aimed at providing Alberta exporters, beef processors and ranchers with the information they need to successfully expand into a rapidly growing beef market in Japan. Kerr is looking into product requirements, accessing the distribution system and marketing, and many other aspects of this complex market.

- There is a widespread feeling in the university community that the provincial government needs to take a more positive view of the universities and their research activities.
- Some sectors of the public and government view universities as highly funded teaching institutions. These groups also believe that the universities should be more efficient and more responsive to the needs of "ordinary Albertans."
- The teaching load of the universities, which appears low in comparison to the teaching load at other types of institutions in the post-secondary system, is often discussed without taking into account the research responsibilities of university faculty.

As mentioned earlier in this report, these perception problems have likely developed in good part because the universities have not succeeded in keeping people well informed. It was suggested that, by working with the private sector, the community and the media, the universities could do much to raise awareness and gather support for university research.

John Tulip (Electrical Engineering, University of Alberta) is working to improve a new surgical laser that causes less pain and allows the patient to leave the hospital almost immediately. The YAG laser cuts tissue and coagulates blood, whereas the more common carbon dioxide lasers cannot stop bleeding. It can also be used to perform surgery without incisions: Tulip's research is aimed at reducing the YAG laser's size, complexity and cost.

People need to know more about the university's mission, which incorporates both teaching and research, and about the complexities involved in organizing and operating a university. They need to know, for example, that although university faculty carry a lighter responsibility in terms of hours in the classroom than teachers in colleges, technical institutions and public schools (but often-especially with respect to undergraduate classes-have many more students in each class), they generally work long hours each week. Their research activities, and the value of these activities, is currently not visible to most casual observers of the university scene.

And people need to know that university research responds to specific national, provincial and community needs. For example, Alberta, which has a resource-based economy, is known for its leading edge university research and development activities related to resource-based industries. Because the benefits of research often accrue over a long period of time, the results achieved are frequently imperceptible to the general public.

POLICY FRAMEWORK AND RECOMMENDATIONS

A diagnosis

Over the course of this extensive consultation and review process, I have found that Alberta has a fine university system and an enviable research reputation throughout Canada. For a number of years now, the universities of Alberta and Calgary have been among the leading research-intensive universities in Canada. As well, the level and quality of research conducted at the University of Lethbridge places it at the top of the scale among Canada's small universities.

I believe that this position of leadership, which is the result of substantial and sustained investments by the provincial government over many years, is now being seriously challenged on two fronts. The major challenges are coming from:

1. changes in the fiscal environment, and
2. misconceptions in various sectors regarding the value of university research and an appropriate role for universities in Alberta.

Athabasca University was one of 78 partner organizations involving industry, academia, business and the community that made a submission for funding under the Networks of Centres of Excellence program. The Athabasca University portion of the Technology Based Learning Network focused on information technology as it affects education. Athabasca University was to provide a technology-based learning environment as a test-bed for the network. The goal of the project was to allow Canadians at all levels and in all types of work to educate and re-educate themselves in information systems and many other disciplines.

Changes in the fiscal environment

Most people agree that the Alberta government's efforts to achieve a balanced budget are necessary. In the case of reductions in the funding for universities, the government respected the universities' traditional autonomy and asked that they find ways to internally manage the funding reductions.

Of course, much of the direct funding for research projects comes from external sources. Nonetheless, the reduction in provincial government operating grants to universities has had a major impact on research because these funds cover a large proportion of the indirect infrastructure costs. But a lack of money for infrastructure is just the beginning of the story.

Once the quality of the research at a university is seriously threatened, then outstanding researchers become less interested in working there. A serious faculty recruitment and retention problem develops. Then, because the leaders in a field have begun to go elsewhere, the reputation of a university's research program begins to decline, and the best graduate students are no longer attracted to the program.

Faculty who remain start to develop a morale problem.

In general, Alberta's universities have accepted the necessity of dealing with current fiscal realities and are finding ways to innovate and adapt. However, lower levels of infrastructure support (resulting from lower operating grants) are having an effect on teaching loads. Classes are larger, and students have less contact with their professors. There is less time for research work and a lack of funds for libraries and equipment, both of which are vital with today's rapidly changing technologies.

A brief submitted by the University of Alberta includes this statement:

> *Recent AECD policy requires the University of Alberta to maintain high enrolments with a lower budget. It is an unavoidable consequence that resources available for research to an individual faculty member, especially his/her time, are becoming compromised. In some faculties we have already reached the unacceptable situation where only the summer months are available for meaningful research. Although our strategic plan (representing university policy) calls for differential teaching/research loads, this has not yet been widely implemented at the department level where teaching assignments are made. In the interest of protecting time for research, we must also find ways to teach more effectively, and ensure that all low-enrolment courses are required.*

The intensity of the competition in research requires ever-vigilant efforts to be not only "adequate" but outstanding, and these efforts cannot take place without a certain level of continuous financial support. I believe that, if the current fiscal constraints continue for long, Alberta will be risking a serious deterioration in the quality of its university research system, and hence in the quality of its universities in general.

Misconceptions about the value of research and the role of universities

Regarding people's perceptions about university research, I have reached two conclusions.

1. The public and government need to develop a greater appreciation of:
    a) the importance of the research mission of the universities, and the way in which universities differ from colleges
    b) the complexity and dynamism of the research system in each university
    c) the necessity for Alberta's university system to remain at the forefront of knowledge across disciplines.

2. The universities are waiting for a clear signal from government regarding the level of priority the government is willing to give to the universities in general and to university research in particular.

These problems must be dealt with in the near term. They are presenting significant barriers to the adoption of a positive climate in which to develop and support excellence in university research.

In the first instance, the onus is on the universities to take action. The second point is the responsibility of the government.

People's perceptions about universities and university research are almost as significant as funding in creating a positive environment. If the level of public confidence in universities and university research is low, then public funding will not be readily available.

In my view, the problem of the public's perception of the universities goes beyond a lack of appreciation for the university research function. I feel that much of the current criticism of universities is the result of misunderstandings about the overall education function of the universities. This situation is exacerbated during periods of fiscal constraint and a tighter job market for university graduates.

Therefore, the universities must take a more active role in developing public support. The universities must demonstrate that they are responsive - that they are effectively meeting appropriate labour market needs as well as broader educational needs. And, all of this must be achieved in the context of reduced public funding and increasing demands for greater accountability.

John Spence (Entomology, University of Alberta) is participating in an international effort to find safe alternatives to the widespread use of pesticides. The goal of Spence's research is to promote an "ecological engineering" approach - understanding how natural (biological and cultural) systems work and then applying this understanding to resource management and conservation in agriculture and forestry.

The universities must address this issue quickly and effectively, by developing plans for transparency, open communications and awareness-raising. In the context of these relatively new and, in my view, increasingly serious challenges to the quality of university research in Alberta, I believe it is important for AECD to take on a more active role in support of university research. The department must clarify its role and responsibilities in this area, and let the universities know what the government expects in terms of the quality of the research function and the effectiveness of the research system. To begin, the government must clarify its expectations by identifying the research standards and benchmarks it is setting for universities in this province, in comparison to other Canadian universities.

And finally, the universities need to know who in Cabinet is responsible for the university research system.

Preceding sections of this report describe how research is a fundamental component of university education programs, and why public expenditures on university research are a wise and necessary investment. Long-range planning is needed. The excellent quality of university research that has been built in Alberta cannot be put "on hold" until the financial situation improves. Quality cannot stay "on hold." In this complex, competitive and fast-moving field, a commitment to quality or a sharp decline in competitiveness are the only options available to Albertans.

And, letting Alberta's competitiveness decline is no more an option than spending money that the government does not have. University research is an essential part of the present and future in Alberta. It is not a frill or something that would be nice to have.

Goal statement for a university research policy

Any policy framework for university research must first consider the desired goals and outcomes the framework is to address. During the consultation and in my subsequent review of written submissions, I became convinced that the following goal statements are both necessary and sufficient to provide a comprehensive basis for a policy framework for university research in Alberta. (In this regard, I want to give special acknowledgment to the contributions of Dr. Martha Piper and Dr. Cooper Langford, Vice-Presidents, Research, at the University of Alberta and The University of Calgary, respectively. As they will quickly recognize, many of their invaluable words and thoughts are included in the following paragraphs.)

1. to contribute to *human resource development* by training a highly educated and competitive workforce, providing for a new generation of researchers, and providing for the broad education of Albertans in general, and
2. to contribute to the *cultural, social and economic development of Alberta* through access to and the development of new knowledge.

And, to make these two fundamental goals become a reality, many people have identified the following instrument goal:

- to leverage *funds and resources from other jurisdictions in support of Alberta goals and high quality jobs for Albertans.*

These funds and resources would not only support further research but would also serve as an investment in the development of Alberta that flows from university research.

A policy framework

Recently, the government of Alberta has not been able to invest in the university system as heavily as it has done for a large number of years. However, the government has taken strong fiscal action to balance its budget and bring order to the financial affairs of the province. It will be in a better position to look at its expenditures and investments for the medium and long term. It is thus very timely for Alberta to define its goals and policies with respect to university research.

The following recommendations were drafted in that context.

1. Responsibilities within the government

Based on my analysis of the situation in Alberta, and on what I heard during the consultations, I believe that the Minister of Advanced Education and Career Development must:

- be recognized as the spokesperson for the universities within government on matters related to university research
- be a party to the development of any government policies and initiatives that relate to university research
- take an active role in fostering and maintaining a high quality of research across the full spectrum of disciplines in the Alberta university system
- provide universities with research infrastructure funding at a level sufficient to ensure high quality research, especially in areas defined as priorities by the respective institutions
- be responsible for the formulation of any other policies that support excellence in university research (such as those recommended below).

To ensure that the Minister has adequate support and informed advice regarding these responsibilities, I am making two recommendations:

1.1 The Minister should establish a small advisory body to assist him in his expanded role.

This advisory body would be charged with providing advice on ongoing policy matters related to university research. It would be comprised of people who are knowledgeable about universities and university research. (It would be desirable to have a majority of members who are independent of the universities.)

1.2 AECD should formally identify a small unit within the department as the area responsible for university research.

By formally identifying such a unit, AECD would be clearly indicating its recognition of the importance of university research and its plans to commit ongoing resources to this area.

2. Enhancing the university research infrastructure

AECD has a role to play in ensuring high quality research within the Alberta university system, and in keeping the majority of the results of these research activities in the public domain. The following three recommendations (2.1, 2.2 and 2.3) suggest actions that AECD could take to enhance the university research infrastructure in Alberta.

2.1 AECD should work with the universities to develop strategies/ incentives to assist the universities in retaining and attracting quality faculty.

As a starting point, the universities should begin to collect systematic data on faculty mobility and related issues.

2.2 AECD should support the universities in their efforts to attract quality graduate students to Alberta by removing the differential tuition policy for out-of-country graduate students.

2.3 Through incentives, AECD should encourage the private sector to participate more actively in improving the university's research infrastructure.

3. Improving and reporting on the effectiveness of the university research system

3.1 AECD should continue its work on performance evaluation mechanisms, in collaboration with the universities, as part of its ongoing work on key performance indicators.

3.2 AECD should explore the use of incentives to encourage the universities to continue and expand their work on inter-university research and graduate studies coordination.

Although the collaboration and complementarity that develops will not represent a large portion of the total picture, the results of this type of activity will be extremely valuable. Centres of excellence could be further established at different universities to avoid duplication of effort. There could be more

networking among Alberta universities and with other Canadian universities. Increased use of video and other communication and information technologies could be used to support collaborative activities when such approaches prove to be cost effective.

3.3 The universities should make regular reports to AECD regarding their progress on inter-university coordination initiatives.

3.4 AECD should encourage collaboration and linkages with other universities in Canada and abroad.

One of the best ways of evaluating the quality of research activity in Alberta universities is to examine the degree of collaboration and interaction with leading research institutions in Canada and abroad. In addition, collaboration increases the effectiveness of research and maximizes opportunities for access to new knowledge that is generated around the world.

One example of these linkages is the strong involvement of Alberta universities in the Networks of Centres of Excellence program. AECD should explore with the universities ways to reinforce and strengthen this kind of collaboration.

A brief from the Office of the Vice-President (Research) at the University of Alberta addresses this topic:

> *Alberta universities, and the University of Alberta in particular, have taken excellent advantage of the Networks of Centres of Excellence (NCE) program. The U of A participates as a major node in most of the renewed Phase II NCE's, and it serves as the administrative base for the top-ranked network, the Protein Engineering Network of Centres of Excellence. The U of A has taken a leadership role in developing proposals for new Phase II opportunities, where our faculty have shown exceptional ability to foster linkages with industry, government and other academic institutions across the country. Where Alberta has not taken a leadership role when compared to BC, Ontario and Quebec, however, is in the provision of formula-based funds from the provincial government for the support of NCE's.*

4. Competing for funds from federal research granting councils

The federal university granting councils are the most important sponsors of university research in the country. The competition for federal research funds is high, and becoming even more intense since the federal granting councils will have reduced funding in the future. If Alberta is to continue to compete in this atmosphere, the universities may need some assistance from the provincial government. One approach would be to provide matching funds for

infrastructure and indirect costs to universities on the basis of their success in obtaining federal funds.

4.1 AECD should examine ways of providing additional infrastructure support to the universities in some proportion to their success in federal granting council competitions.

5. Liaising with the Alberta Science and Research Authority (ASRA)

The newly created Alberta Science and Research Authority has a mandate to identify priorities and coordinate research investment made by the province of Alberta. This initiative will necessarily involve the universities, as they carry out a large portion of government-sponsored research.

5.1 AECD should develop an ongoing liaison with the Alberta Science and Research Authority (ASRA) to ensure that the actions of AECD and the ASRA are harmonized.

6. Dealing with perceptions

As mentioned earlier, my consultations have led me to conclude that many sectors of society, including the government, need to gain a better appreciation of the research function of the universities. This includes seeing the universities as distinct institutions because of their research function, recognizing the importance of university research, and appreciating the complexity and the dynamism of the university research system in each institution. I have also concluded that the universities are waiting for a positive signal from government as to the importance it is willing to give to university research.

In this regard, I am making three recommendations.

6.1 The universities should develop an aggressive, broad-based program of improved public communications about the university research system.

6.2 The Minister of Advanced Education and Career Development should ensure that government is fully apprised of relevant dimensions of university research in order to facilitate a full context for decision-making. Relevant dimensions include the quality of university research, the systems used to evaluate faculty members and their research activities, faculty mobility, and research accountability.

The outcomes of key performance results will no doubt begin this process, but more can be done to further inform the decision-making context of the department and the government.

6.3 The government, through the Minister, should clarify:

a) the importance it attaches to universities and university research programs, and the contributions they make to life in Alberta, and

b) the level of priority the government is prepared to give to university research.

There is an urgent need to establish Alberta's image, in the eyes of the university and the business community, as a place where research is valued and where outstanding researchers are appreciated. Such a clarification, in and of itself, would improve the climate and morale in the research community, and would significantly assist universities in Alberta in their efforts to retain and attract quality faculty members and graduate students.

A final note

I am aware of the Alberta government's ongoing commitment to maintaining a balanced budget. Inevitably, however, the implementation of the majority of my recommendations will involve at least a modest amount of funding. Whenever feasible, I have suggested that the government and the universities use incentives for leveraging, such as matching grants. Although several of the suggested incentives could be rationalized with the new funding approach that the department is developing, in the main I would recommend that university research be given a high level of priority for government re-investment.

I also recognize that many of my recommendations cannot be acted upon immediately. In some cases, the decision process may take as long as two or three years. The government should therefore consider taking interim measures to accommodate some of the most urgent needs.

APPENDIX A
LIST OF PARTICIPANTS

I. University Sector

University of Alberta

Rod Fraser
President

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Vice-President Research

Bill Bridger
Associate Vice-President Research

Murray Gray
Dean, Graduate Studies & Research

Patricia Clements
Dean, Faculty of Arts

David Lynch
Acting Dean, Engineering

Dick Moskalyk
Dean, Pharmacy & Pharmacy Science

Harvey Zingle
Dean, Education
Engineering

Bruce Dancik
Chair, Renewable Resources (for Dean, Agriculture, Forestry, Home Economics)

Art Quinney
Dean, Physical Education and Recreation

Bob Hinings
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Ernie Ingles
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Henry Dick
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Jim Murray
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Claudia Gomez
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Lori Petruskevich
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Ian Potter
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Mechanical Engineering

Mayja Embleton
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Jason Allen
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ENDNOTES

1 Alberta Advanced Education and Career Development is the government department responsible for adult learning in the province (including post-secondary education, training and re-training programs).

2 The universities operate autonomously from the government. They receive grants and, within the guidelines of the *Universities Act*, decide how best to use the available funds to achieve their goals.

3 In this report, research is defined broadly, as "scientific research, scholarly activity and creative works."

4 Other major provincial government sources include Alberta Energy, Alberta Economic Development and Tourism, and Alberta Environment.

5 AHFMR funding is provided on the basis of quality and is intended to build and sustain world-class excellence in medical research in Alberta.

6 Technology and Research Advisory Committee, *Research and Development Overview Report*, 1991-92.

7 Sources of data: University of Alberta and Canadian Association of University Business Officers (CAUBO).

8 A complete list of participants is provided in Appendix A.